

WHAT IS CLAIMED IS:

- 1 1. A probe microscope comprising:
2 a probe;
3 a scanner for generating relative motion between said probe and a sample;
4 a manual input device having a substantially unlimited range of
5 mechanical motion to control a separation between the sample and said
6 probe, said manual input device having a substantially unlimited range of mechanical
7 motion;
8 a detector that generates a probe motion signal related to movement of
9 said probe;
10 an alerting device responsive to said signal to provide substantially real-
11 time feedback to an operator, the feedback being indicative of interaction between the
12 sample and said probe.
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1 2. The probe microscope of Claim 1, wherein said alerting device is a
2 mechanical resistance device coupled to said manual input device.
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1 3. The probe microscope of Claim 2, wherein said manual input device is a
2 rotatable knob.
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1 4. The probe microscope of Claim 3, wherein said resistance device is a
2 passive resistance device that changes an amount of torque necessary to turn the knob.
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1 5. The probe microscope of Claim 4, wherein said passive resistance device
2 is a brake.
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1 6. The probe microscope of Claim 4, wherein the amount of torque is related
2 to a magnitude of the interaction.
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1 7. The probe microscope of claim 2, wherein said resistance device is an
2 active resistance device.

1 8. The probe microscope of Claim 7, wherein said active resistance device
2 actively moves said manual input device.

1 9. The probe microscope of Claim 2, wherein the feedback produced by said
2 resistance device is variable.

1 10. The probe microscope of Claim 9, wherein the probe motion signal is
2 indicative of a tip-sample interaction, and wherein the variable resistance is related to the
3 interaction.

1 11. The probe microscope of Claim 1, wherein the feedback produces an
2 audible output, wherein the audible output is related to a magnitude of the interaction.

1 12. The probe microscope of Claim 11, wherein the audible output is one of
2 pitch and volume.

1 13. The probe microscope of Claim 1, further comprising
2 a displacement sensor that measures the relative motion between said
3 probe and the sample and generates a corresponding position signal; and
4 a closed-loop feedback controller that generates a drive signal in response
5 to the position signal.

1 14. The probe microscope of Claim 3, wherein said knob has a range of
2 motion greater than 180°.

1 15. The probe microscope of Claim 1, wherein the feedback is one of
2 substantially proportional, exponential and logarithmic with respect to the interaction.

1 16. A method of making a force curve measurement on a sample, the method
2 comprising:
3 manually controlling a separation between a probe and the sample;
4 measuring the separation;
5 detecting a force on the probe in response to said generating step;
6 providing an alert based on the force; and
7 wherein said controlling step includes using a rotatable knob.
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1 17. The method of Claim 16, wherein said providing step includes using a
2 brake to control a torque required to rotate the knob.
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1 18. The method of Claim 17, wherein the torque is proportional to the force.
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1 19. The method of Claim 16, wherein the knob has a range of motion greater
2 than 180°.
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1 20. The method of Claim 16, further comprising the step of repeating said
2 controlling step in response to at least of one said measuring and detecting steps.
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1 21. The method of Claim 16, wherein the alert is an audio alert.
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1 22. A probe microscope including a probe that interacts with a sample, the
2 microscope comprising:
3 a manual rotary input knob that modulates a separation between the probe
4 and the sample, said knob having a range of motion greater than 180°;
5 an alerting device responsive to interaction between the probe and the
6 sample so as to provide feedback to the operator, the feedback being indicative of a
7 magnitude of the interaction.
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1 23. The probe microscope of Claim 22, wherein said alerting device is a
2 brake.

1 24. The probe microscope of Claim 23, wherein said brake is a passive
2 resistance device that changes a torque required to rotate the knob.

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1 25. A probe microscope comprising:
2 a probe;
3 a scanner for generating relative motion between said probe and a sample;
4 a linear manual input device to control a separation between the sample
5 and said probe;
6 a detector that generates a probe motion signal related to movement of
7 said probe;
8 an alerting device responsive to said signal to provide substantially real-
9 time feedback to an operator, the feedback being indicative of interaction between the
10 sample and said probe.